

Appl. No. 10/707,805
Amdt. dated January 6, 2005
Reply to Office action of October 06, 2004

REMARKS/ARGUMENTS

Claims 1-2 and 7-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Furukawa et al., US patent No. 6,333,533. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furukawa in view of Alsmeier US patent No. 5,867,420. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furukawa in view of admitted prior art.

1. Correction of the Specification:

There is a typographical error appearing in the originally filed specification. Accordingly, the specification is corrected. In paragraph [0008], line 11 the "trap" has been replaced by "strap" as shown in AMENDMENTS TO THE SPECIFICATION section. No new matter is entered. Acceptance of the corrected specification is therefore politely requested.

2. Correction of Claim 1:

Claim 1 is objected to because of the following informalities: On line 10, the word "potion" appears to be a typographical error. Appropriate correction is required. Thus, an appropriate correction of claim 1 has been done to replace the word "potion" by "portion" as shown in AMENDMENTS TO THE CLAIM section, which does not change the substantial subject matter of claim 1. No new matter is introduced. Reconsideration of claim 1 is thereby requested.

3. Rejection of claims 1-2 and 7-8 under 35 U.S.C. 102(b):

Claims 1-2 and 7-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Furukawa et al., US patent No. 6,333,533, for reasons of record that can be found on pages 2-4 in the Office action identified above.

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(1) Response to claim 1:

According to claim 1, one of the main characteristics of the present application includes that *the isolation structure is directly positioned on the trench capacitor so as to isolate the trench capacitor from other elements positioned above the trench capacitor.* As shown in Fig.11, the trench capacitor 52 comprises a storage node 60, a buried N⁺ plate 62, a capacitor dielectric layer 64, and a buried strap 61 positioned on the storage node 60 and electrically connected to the storage node 60. The first isolation portion 90 of the isolation structure 86 and the liner 84 completely cover the buried strap 61 with directly contacting the buried strap 61, and fill the top opening of the deep trench 56. Thus, *there is no other conductive layer positioned between the isolation structure 86 and the trench capacitor 52.*

Referring to the application of Furukawa et al., they teach a structure including a vertical transistor and a trench capacitor positioned in a deep trench. According to the figures (such as Fig.10) and patent of Furukawa et al., a conductor 77 (or 79) is positioned on the top portion of the deep trench 39 for connecting the conductive layer 69 formed with n+ polysilicon, wherein the conductor 77 serves as a word-line that contacts the top surface of the conductive layer 69 which serves as a gate of the vertical MOSFET (col. 6, lines 1-10). Accordingly, *the first isolation portion mentioned by Examiner of the isolation structure 75 disclosed by Furukawa et al. is only positioned at the sides of the conductor 77(or 79) but does not fill the top opening of the deep trench 39, while it is the conductor 77 filling most portions of the top opening of the deep trench 39. In addition, the first isolation portion does not directly contact the trench capacitor. Oppositely, the conductive layer 69 serving as a gate and an oxide layer 65 are positioned between the first isolation portion of the isolation structure 75 and the trench capacitor. Therefore, in contrast with isolating the trench capacitor, it is obviously that the isolation structure 75 is used to isolate the vertical transistor (MOSFET) from other elements, such as adjacent*

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transistors, on the substrate 31.

From the above discussion, the position and functionality of the isolation structure claimed in claim 1 of the present application are quite different from the isolation structure 75 disclosed by Furukawa et al. Therefore, the applicants believe that claim 1 is allowable, and reconsideration of the amended claim 1 is politely requested.

(2) Response to claim 2:

Examiner deems that Furukawa et al. teach a second isolation structure is disposed by a side of the collar oxide layer 59, near the conductive layer 57, 69 and the collar oxide layer 59 without being located on the conductive layer 57, 69, which is the same as the subject matter in claim 2 of the present application.

According claim 2 and Fig.11 of the present application, the second isolation portion is disposed by a side of the collar oxide layer 66, near the conductive layer 61 (or 66) serving as a storage node of the trench capacitor 52 and the collar oxide layer 66 without being located on the conductive layer 61 (or 66) and the collar oxide layer 66.

However, referring to Fig.10 of Furukawa et al., the second isolation portion of the isolation structure 75 mentioned by Examiner is disposed only near the conductive layer 69 serving as a gate, but not disposed by a side of the conductive layer 57 serving as a storage node of the trench capacitor. Since the gate conductive layer 69 is not the same as the storage node conductive layer 57, the position of the isolation portion of Furukawa et al. is different from that of the present application. Therefore, reconsideration of claim 2 is politely requested.

(3) Response to claims 7-8:

Since claims 7-8 are dependent upon claim 1, they should be allowable if claim 1 is

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allowable. Reconsideration of claims 7-8 is hereby requested.

4. Rejections of claims 4-6 under 35 U.S.C. 103(a):

5 Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furukawa in view of Alsmeier US patent No. 5,867,420, for reasons of record that can be found on page 5 in the Office action identified above.

Since claims 4-6 are dependent upon claim 1, they should be allowed if the amended claim 1 is allowable. Reconsideration of claims 4-6 is thereby requested.

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5. Rejection of claim 3 under 35 U.S.C. 103(a):

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furukawa in view of admitted prior art, for reasons of record that can be found on page 6 in the Office action identified above.

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Since claim 3 is dependent upon claim 1, they should be allowed if the amended claim 1 is allowable. Reconsideration of claim 3 is thereby requested.

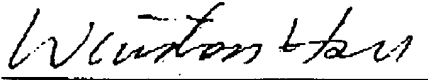
6. Addition of new claim:

20 Claim 19 is currently added according to Fig.11 and paragraphs [0023]-[0024] to more clearly define the relative position between the first isolation portion and the trench capacitor. No new matter is added. Therefore, consideration of claim 19 is politely requested.

25 Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

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Sincerely yours,



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